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ABSTRACT

Although anabolic steroids are associated with short term behavior and long term health problems, few schools address this issue. Adolescents were surveyed to determine their general knowledge of anabolic steroids, attitudes related to fair play, and interest in limiting anabolic steroid use. Data from 322 boys and 331 girls in grades 7-12 were evaluated. Findings indicate: 3 percent of students used anabolic steroids; of the users, 67 percent were athletes; there were few differences in general knowledge among grade levels; with some exceptions, boys' and girls' knowledge of anabolic steroids was similar; many students had positive attitudes toward fair play and were willing to become involved in preventing use of the drugs; and many respondents were unable to identify common signs of anabolic steroid use. Results of the study suggest: (1) education programs should begin at the middle school level; (2) the same curriculum can be implemented initially at the middle school and high school level; and (3) signs of anabolic steroid use should be included in education programs so appropriate interventions can be initiated. (Contains 19 references.) (Author/LL)

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Knowledge about Anabolic Steroids of Rhode Island Adolescents: Implications for Education Programs

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ABSTRACT

Although anabolic steroids are associated with short term behavior and long term health problems, few schools address anabolic steroids. Adolescents were surveyed to determine their general knowledge of anabolic steroids, attitudes related to fair play, and interest in limiting anabolic steroid use in order to assist program planners to address the needs of adolescents concerning anabolic steroids. Data from 322 boys (14.5 ± 1.1 years; mean ± SD) and 331 girls (14.2 ± 0.9 years) in grades 7-12 were evaluated. Three percent of the students used anabolic steroids. Of the users, 67% were athletes. Few differences in general knowledge were found among grade levels. With some exceptions, boys' and girls' knowledge of anabolic steroids was similar. Many of the students had positive attitudes toward fair play and were willing to become involved in preventing use of the drugs. However, many of the respondents were unable to identify common signs of anabolic steroid use. The results of this study suggest 1) education programs should begin at the middle school level, 2) the same curriculum can be implemented initially at the middle school and high school level, and 3) the signs of anabolic steroid use should be included in education programs so appropriate interventions can be initiated.

Many experts are concerned about the nonmedical use of anabolic steroids especially that by teenagers. More than 250,000 adolescents use or have used anabolic steroids with the majority of users beginning to use the drugs at age 16 or younger (Buckley et al., 1988). Typical teenage concerns motivate adolescents to use anabolic steroids. Teenagers use anabolic steroids to play better, to look better, to feel better, and to gain approval from others (Buckley et al., 1988; USDHHS, 1990).

Anabolic steroid use is associated with the development of serious health problems. Although the specific health problems related to anabolic steroids are not well documented, some of the health problems attributed to anabolic

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steroid use include liver disorders, cancer, altered blood lipids, reproductive alterations, heart attacks, and strokes as well as AIDS (USDHHS, 1991b). Adolescent users also risk premature closure of the growth plates in the long bones resulting in shortened stature. Additional health problems may also occur because anabolic steroid use can lead to using other drugs (Asken, 1990; DuRant, Rickert, Ashworth, Newman, & Slavens, 1993).

Despite the threats to health posed by anabolic steroids, many schools do not provide adequate information to students to allow them to make informed decisions concerning anabolic steroid use (White, Richardson, Grosshans, Perkins, & Murdock, 1987). Though specific information is lacking about the number and types of school-based education programs, it is estimated that fewer than 25% of the nation's schools provide information about anabolic steroids (USDHHS, 1991b). When education/prevention programs are implemented in schools, they are typically directed toward athletes. However, a recent survey revealed that approximately one-third of the students who reported using anabolic steroids were not involved in school-sponsored athletics (Buckley et al., 1988). Thus, educational intervention efforts need to be directed toward a much broader population.

Information about the knowledge of anabolic steroids possessed by adolescents is essential for planning and implementing effective education programs. The purpose of this study was to describe the extent of knowledge and attitudes of adolescents in Rhode Island in order to assist program planners to address the needs of adolescents concerning anabolic steroids.

Methods and Materials

A total of 322 boys and 331 girls in grades 7-12 were administered a survey designed to elicit information about their general knowledge of anabolic steroids including signs of use, outcomes related to anabolic steroids, and performance-enhancing effects, their attitudes related to fair play, and their interest in

preventing use. Information related to current anabolic steroid use and participation on school-sponsored athletic teams was also obtained from the survey. The survey was distributed to students present in health classes at selected schools on the study date after informed consent was obtained from the school principal and health teachers.

The survey instrument used a 5 point Likert Scale with the possible responses ranging from strongny disagree to strongly agree. Students were requested to respond to each statement as honestly as possible and were allowed to skip questions that they believed they could not answer honestly. To assure anonymity and confidentiality, surveys were sealed in an envelope. In addition, school and student names were not collected.

Results

Mean age of the boys who completed the survey was 14.5 $\pm$ 1.1 years ($\pm$ SD) and mean age of the girls was 14.2 $\pm$ 0.9 years. Overall, 51% of the respondents were girls and 49% were boys. The greatest proportion of the respondents were ninth graders (N = 142; 22%) followed in order by tenth graders (N = 130; 20%), eleventh graders (N = 119; 18%), seventh and eighth graders (N = 94; 14% each) and twelveth graders (N = 74; 11%). Approximately 40% of the boys and 30% of the girls participated in school-sponsored sports.

Results of the survey indicated that anabolic steroids are used mainly, but not exclusively, by male high school athletes. Of the 21 students (3%) who were currently using anabolic steroids, 17 students were males. Eleven high school students reported current use and seven middle school students were currently using (Three of the users did not report their grade level.). Two-thirds of the users (N = 14) participated in school-sponsored athletics.

In assessing students' knowledge of the signs of anabolic steroid use, seventh graders were less informed than the other students about the physical signs of use (Table 1). Fewer than 25% of the seventh grade students reported

they were aware that acne, shrunken testicles, premature baldness, and increased facial hair in women were signs of anabolic steroid use. However, the seventh grade students' knowledge of behavioral and psychological signs of use including increased fighting and depression was similar to that of the older students. Generally, the respondents were better informed about the behavioral and psychological signs than the physical signs of use (Table 1). Over one-half of the students were able to identify increased fighting, depression and severe mood swings as behavioral and psychological signs of anabolic steroid use. In contrast, fewer than one-half of the students knew that acne, bloating, and premature baldness were physical signs of anabolic steroid use.

Table 1. Student knowledge of the signs of Anabolic Steroid Use

Sign	Group					
	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
Acne	24%	37%	38%	39%	60%	51%
Shrunken testicles	23	58	68	64	74	56
Bloating	45	30	37	37	42	37
Stunted growth	46	74	77	65	67	62
Baldness	13	43	28	28	39	30
Increased facial hair	11	35	54	51	62	44
Increased fighting	55	44	55	58	57	54
Depression	53	59	54	58	55	56
Mood swings	66	81	80	76	78	76

Some gender differences were found in the students' ability to recognize signs of anabolic steroid use (Table 2). The girls tended to be more aware of the signs common to both genders. For example, between 35% to 51% of the girls at each grade level recognized bloating as a physical sign of anabolic steroid use while 27% to 44% of the boys were able to identify bloating as a sign of

use. Approximately 60% of the girls compared to 55% or fewer of the boys knew anabolic steroid users can suffer from depression. With the exception of the seventh and eighth graders, 80% or more of the girls compared to 70% or more of the boys were aware anabolic steroid users can experience severe mood swings. The girls, however, tended to be unaware of the signs of use in males. For instance, about one-third or fewer of the girls at each grade level could identify premature baldness as a sign of use. At least one-third or more of the boys were aware premature baldness is a physical sign of anabolic steroid use.

Table 2. Student Knowledge of the Signs of Anabolic Steroid Use by Gender and Grade Level

Sign	Gender	Group Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
	Boys						
Acne		20%	49%	32%	36%	60%	63%
Shrunken testicles		36	56	75	72	76	61
Bloating		41	27	28	25	44	29
Stunted growth		56	82	81	67	69	55
Baldness		20	53	31	37	46	32
Increased facial hair		16	36	56	49	60	47
Increased fighting		52	42	56	59	57	55
Depression		46	53	46	57	54	55
Mood Swings		69	85	71	74	71	74
	Girls						
Acne		27	27	43	40	63	36
Shrunken testicles		7	57	62	55	77	52
Bloating		51	35	42	41	45	44
Stunted growth		34	67	72	61	69	69
Baldness		7	31	25	15	36	25
Increased facial hair		7	33	53	52	69	42
Increased fighting		57	45	53	55	61	52
Depression		61	61	59	57	58	56
Mood Swings		61	77	86	78	86	78

When the students' knowledge of the outcomes related to anabolic steroid use were assessed, additional gender differences were noted. Greater proportions of the girls at each grade level reported they believe anabolic steroids can cause physical and psychological addiction (Table 3). Around 90% of the girls and 80% or less of the boys thought anabolic steroids were addicting. At least one-third of the girls were aware that using anabolic steroids can lead to additional drug use compared to one-tenth or more of the boys.

Table 3. Student Knowledge of Possible Outcomes Related to Anabolic Steroid Use

Group	Possible Outcomes			
	Addiction	Physical Injury	Additional Drug Use	Permanent Side Effects
Grade 7				
Boys	83%	80%	54%	56%
Girls	89	93	61	66
Grade 8				
Boys	78	91	46	80
Girls	88	84	53	71
Grade 9				
Boys	63	80	31	65
Girls	89	83	42	67
Grade 10				
Boys	79	88	37	84
Girls	87	85	32	80
Grade 11				
Boys	73	83	27	67
Girls	88	91	48	73
Grade 12				
Boys	47	74	11	66
Girls	89	75	42	69

The boys, however, were more aware of the performance-enhancing effects of anabolic steroids (Table 4). With one exception, greater percentages of boys at each grade level believed anabolic steroids could improve performance, increase strength and body weight, and increase the ability to train more intensely and more often. For example, at least two-thirds of the boys believed

anabolic steroids could increase body weight compared with 40% or more of the girls. More than 50% of the boys compared to 40% or more of the girls thought anabolic steroids could increase muscular strength. Almost one-half or more of the boys compared to almost 30% of the girls thought anabolic steroids could enhance athletic performance.

Table 4. Student Knowledge of the Performance-enhancing Effects of Anabolic Steroids

Group	Effect				
	Improved Performance	Increased Strength	Increased Body Weight	Ability to Train Harder	Ability to Train More Often
Grade 7					
Boys	71%	78%	68%	54%	33%
Girls	28	49	40	26	26
Grade 8					
Boys	47	64	71	44	31
Girls	31	48	47	33	20
Grade 9					
Boys	53	54	59	44	43
Girls	40	49	53	34	17
Grade 10					
Boys	49	64	68	34	26
Girls	32	49	53	20	12
Grade 11					
Boys	65	67	76	56	44
Girls	35	41	77	33	38
Grade 12					
Boys	71	71	71	42	32
Girls	43	52	66	40	25

Students' attitudes toward fair play were very positive. Approximately 80% of the students believed using anabolic steroids is a form of cheating. About three-quarters of the students believed that winning is not the most important thing in sports. Furthermore, more girls had favorable attitudes. Over 75% of the girls compared to approximately 60% or more of the boys believed winning is not most important in sports. Similarly, over 75% of the girls felt using steroids is cheating compared to approximately 70% or more of the boys.

Students were very willing to become involved in limiting anabolic steroid use. Almost 85% of the students expressed interest in preventing use and about 75% reported they would try to help someone they knew stop using anabolic steroids. Interestingly, twelveth grade students were less likely to be interested in limiting use. Seventy-one percent of the twelveth graders reported they would try to stop someone they knew who was thinking about using anabolic steroids. Sixty-five percent of the twelveth grade students indicated they would help someone stop using.

Discussion

This investigation represents the first survey of the knowledge of anabolic steroids of both male and female anabolic steroid users and nonusers. Educators and others can utilize the descriptive information elicited by this study to develop anabolic steroid education programs. The results of this study support the findings of previous studies that suggest that education programs should be introduced for both athletes and nonathletes at the middle school level and be continued through the high school level (Buckley et al., 1988; Terney & McLain, 1990). The data from this study also suggest that the same curriculum can be implemented initially with age appropriate language at both the middle school and high school level. As the curriculum is further implemented, increasingly more in-depth discussions of the basic content material can be added. However, for optimal effectiveness, different objectives and activities should be emphasized for different groups of students (Goodstadt, 1986). For example, a program directed toward male athletes should be different than one designed for classroom use.

Educational efforts should provide clear, unbiased information and guidance in an atmosphere that allows individuals to develop healthy and safe decisions about drug use (Tricker, 1990). These decisions should be based upon the most accurate up-to-date information available. Factual information should be provided

about both the potential positive and negative effects of anabolic steroids and the legal implications of use (Clark, 1988; USDHHS, 1991b). Denying that anabolic steroids can enhance certain types of athletic performance can cause a loss of credibility. The medical profession lost credibility with many athletes when it denied for many years that anabolic steroids had any effect on athletic performance when it was clear that anabolic steroids did improve athletic performance (USDHHS, 1991a). Furthermore, education programs that provide information only about the negative aspects of anabolic steroids have not been effective in changing adolescent athletes' attitudes toward using anabolic steroids (Bents et al., 1989). Once adolescents have a good understanding of all the effects of anabolic steroids, they will be able to evaluate the health risks and benefits of anabolic steroids when deciding to use them or not.

Influencing adolescents' attitudes about anabolic steroid use requires more than presentation of information about anabolic steroids and their adverse consequences (Bents et al., 1990). Presentations of factual content material should also emphasize healthy alternatives to anabolic steroids such as proper nutrition and appropriate conditioning and strength development programs (Clark, 1988) so that adolescents will have the information they need to accomplish their goals without risking their health. When principles of nutrition and strength training techniques were added to a program that provided factual information about anabolic steroids, adolescent athletes' attitudes toward potential anabolic steroid use were favorably altered (Bents et al., 1990). Programs should emphasize that sound nutrition when combined with individually designed strength development programs produce gains in strength and size that last longer and have few adverse effects. Behaviors and practices that contribute to the well-being and optimal health of the individual should be emphasized to improve athletic performance and appearance.

Many of the students in this study were unable to recognize physical, be-

havioral, and psychological signs of anabolic steroid use. Awareness of the signs of anabolic steroid use not only by students, but by parents, teachers, coaches, and school officials, is important so appropriate interventions and referrals can be initiated. Common signs and symptoms of anabolic steroid use include sudden and dramatic weight gain (especially muscle mass gain), edema, acne, increased aggressiveness and hostility, secretive behavior, and mood swings (Wright & Cowart, 1990). Signs of use in females include deepening of the voice, clitoral enlargement, male pattern baldness, reduction in breast size, and increases in body and facial hair (Wright & Cowart, 1990). Premature baldness, shrunken testicles, and development of female breast tissue (gynecomastia) are common signs of anabolic steroid use in males (Wright & Cowart, 1990).

Education programs should include more than just facts and figures since recent studies suggest that knowledge of the facts related to anabolic steroids may increase the potential to use the drugs (Bosworth, Bents, Trevisan, & Goldberg, 1988; Chng & Moore, 1990). The fact that approximately one-third of the respondents in this study believed that using anabolic steroids is not cheating and that winning is the most important thing in sports suggests that there is a need to examine the moral and ethical issues surrounding anabolic steroid use. A winning-at-any-cost philosophy is pervasive in athletic competition. The increasing demand for anabolic steroids is more closely related to a "be bigger and stronger to win" philosophy than from a "joy to competition" approach to competitive physical activities (Tricker, 1990). Individuals with positive attitudes toward fair play in competition are less likely to look for shortcuts including anabolic steroids to improve athletic performance. Values clarification activities should be included in anabolic steroid education programs to allow students to explore their values that relate to winning at all costs and fair play in sports. These activities can assist adolescents to keep sport in perspective by helping them to understand that health and well-being are more important than any

short-term gains achieved through the use of drugs.

Values clarification skills can help to serve as a basis for making informed decisions concerning anabolic steroid use. Once students understand their own values they can examine issues related to anabolic steroids and evaluate the consequences of anabolic steroid use and their impact upon their values. Activities designed to enhance students' decison-making skills involve a series of steps: define the problem or conflict; identify alternative solutions to the problem; determine the consequences of the alternative solution; select an alternative solution; and evaluate the selected solution (USDHHS, 1983). The emphasis is placed on helping students assume responsibility for their actions once they have considered the consequences of engaging in a particular behavior (USDHHS, 1983).

Effective intervention programs combine both cognitive and behavioral approaches (USDHHS, 1983; American Medical Association, 1991). Encouraging results have been reported from education programs that help students to withstand many forms of social pressure to use drugs (Severson, 1984). Peer pressure has been reported as a strong influence in adolescents' decisions to use anabolic steroids (Johnson, Jay, Shoup, & Rickert, 1989; Chng & Moore, 1990; USDHHS, 1990). Adolescents need to know how to refute the persuasive arguments they can encounter from friends and in gymnasiums to use anabolic steroids. Programs that emphasize teaching specific techniques for resisting pressure through carefully planned, structured activities in combination with accurate information about anabolic steroids provide students with the knowledge and behaviors they need to understand and respond in a positive, healthy way to the influences that encourage anabolic steroid and other drug use.

Since many adolescents seek the advice of peers about many concerns, peer counseling may provide an effective intervention to limit anabolic steroid use in adolescents (Johnson et al., 1989). Peer counseling has been shown to be

effective in other settings (USDHHS, 1983). Peer counseling is described as a support program which should seek to reach a part of a school population that might not go to an adult about a particular problem (USDHHS, 1983). Seventy-six percent of current users report that their friends don't care if they use anabolic steroids (USDHHS, 1990). Data from this study indicate otherwise. The fact that the students in this investigation were willing to become involved in preventing and reducing anabolic steroid use suggests that students may actively participate in a peer counseling program if one were available. Since friends represent a major source of information about anabolic steroids (Johnson et al., 1989; Chng & Moore, 1990; USDHHS, 1990), pressure from peers that discourages anabolic steroid use represents a potentially powerful weapon in the fight to reduce anabolic steroid use by adolescents.

Prevention efforts often take the form of short workshops or presentations from former users (Tricker, 1990). One time presentations of factual information intended to change behavior or attitudes are ineffective because they do not allow for adequate development and reinforcement of newly acquired information and behaviors (Goodstadt, 1986). Information should be provided over an extended period to reinforce information and attitudes and to assist students to understand the relationships among other health topics. Information about anabolic steroids can be implemented into discussions about substance abuse, mental health, sports diets, wellness, weight control, self-esteem, body image, ergogenic aids, and coping with stress and anxiety.

Education efforts should target adults as well as adolescents. Parents, teachers, coaches, athletic trainers, school officials, and health care officials including physicians should also be educated about anabolic steroids (Chng & Moore, 1990; USDHHS, 1991a). In order to prevent anabolic steroid use, adolescents must receive clear, consistent meassages about the drugs from adults. Interviews with former and current users indicate that parents, coaches, and peers

do not discourage use and may even encourage use (Chng & Moore; 1990; USDHHS, 1990; USDHHS, 1991a). Health professionals including physicians and pharmacists are often reported as the primary sources of the drugs (Chng & Moore, 1990; Terney & McLain, 1990; USDHHS, 1990). Other studies indicate that almost one-quarter of adolescent users obtain anabolic steroids from a coach (Chng & Moore, 1990; Terney & McLain, 1990). Adults, especially those in frequent contact with at-risk youth, should take an active stand against the use of anabolic steroids, since silence may be misinterpreted as condoning the use of the drugs.

Conclusions

Rhode Island adolescents were surveyed about their general knowledge of anabolic steroids, attitudes related to fair play, and interest in preventing and reducing anabolic steroid use. This information can be utilized by individuals planning anabolic steroid education programs for adolescents in grades 7-12. Education efforts should begin as early as middle school age and be repeated often to reinforce newly acquired skills and attitudes.

Although some gender specific differences in general knowledge of anabolic steroids were revealed, boys' and girls' knowledge was similar. Few differences in general knowledge were found among grade levels. Many of the students in this investigation had positive attitudes concerning fair play in competitive activities and were willing to become involved in preventing use of the drugs. However, many of these adolescents were unable to recognize common signs of anabolic steroid use. Factual information should be provided about both the positive and negative effects of anabolic steroids as well as healthy alternatives and the signs of anabolic steroid use. Opportunities should also be provided for exploring moral and ethical aspects of anabolic steroids and the value of fair play in sports.

Future research should attempt to identify adolescents at risk, factors that influence anabolic steroid use, and the knowledge of anabolic steroids of

specific populations, especially those at risk, in order to develop effective education programs. The effectiveness of these education programs for specific populations should also be evaluated.

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